4.7 Greenhouse Gas Emissions

This section of the EIR describes the potential cumulative impacts of the Master Plans associated with the generation of greenhouse gases (GHG), climate change hazards, and compliance with applicable plans, policies, and regulations adopted for the purpose of reducing the emissions of GHG.

As discussed in Chapter 4, Environmental Analysis, the following CIP projects have been addressed in previous CEQA documents: Sewer CIP Projects SR-6, SR-10, SR-25, N-1, N-2, N-5, N-7, N-8, N-10, N-11, I-3, I-4, I-5, and I-6; Water CIP Projects 7, 8, 40, and R6; and Recycled Water CIP Project ES3. However, these prior CEQA documents did not address energy impacts. Therefore, these projects are included in this analysis.

4.7.1 Environmental Setting

4.7.1.1 Global Climate Change Overview

Climate change refers to any substantial change in measures of climate (such as temperature, precipitation, or wind) lasting for decades or longer. According to the U.S. Environmental Protection Agency, the Earth's climate has changed many times during the planet's history, including events ranging from ice ages to long periods of warmth. Historically, natural factors such as volcanic eruptions, changes in the earth's orbit, and the amount of energy released from the sun have affected the earth's climate. Some GHGs, such as water vapor, occur naturally and are emitted to the atmosphere through natural processes, while others are emitted through human activities. Beginning late in the 18th century, human activities associated with the Industrial Revolution have also changed the composition of the atmosphere and therefore very likely are influencing the earth's climate. For over the past 200 years, the burning of fossil fuels, such as coal and oil, and deforestation has caused the concentrations of heat-trapping GHG to increase substantially in the atmosphere.

The accumulation of GHGs in the atmosphere regulates the earth’s temperature. Without the natural heat-trapping effects of GHGs, the earth’s temperature would be about 34 degrees Celsius cooler (California Climate Action Team [CCAT] 2007). However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations.

The Global Carbon Project (2011) released an update of the global carbon budget for the year 2010. The atmospheric carbon dioxide (CO_2) concentration in 2010 was 390 parts per million (ppm), 39 percent above the concentration at the start of the Industrial Revolution (about 280 ppm in 1750). The 2010 growth rate of atmospheric CO_2 of 2.36 ppm was one of the largest growth rates in the past decade (2000-2009), which has had an average growth rate of 1.9 ppm per year.

4.7.1.2 Greenhouse Gases

GHGs are gases that trap heat in the atmosphere, analogous to the way a greenhouse retains heat. Common GHGs include water vapor, CO_2, methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), ozone (O_3), and aerosols. Global atmospheric concentrations of CO_2, CH_4 and N_2O have increased markedly as a result of

human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years.

Individual GHGs have varying heat-trapping properties and atmospheric lifetimes. Table 4.7-1, identifies the CO_2 equivalent (CO_2e) and atmospheric lifetimes of basic GHGs. Each GHG is compared to CO_2 with respect to its ability to trap infrared radiation, its atmospheric lifetime, and its chemical structure. The CO_2e is a consistent methodology for comparing GHG emissions since it normalizes various GHG emissions to a consistent measure. For example, CH_4 is a GHG that is 21 times more potent than CO_2; therefore, one metric ton of CH_4 is equal to 21 metric tons CO_2e.

Table 4.7-1 Global Warming Potentials and Atmospheric Lifetimes of Basic GHGs

GHG	Formula	100-year global warming potential[(1)]	Atmospheric lifetime (yrs)
Carbon dioxide	CO_2	1	50-200
Methane	CH_4	21	12
Nitrous oxide	N_2O	310	114
Sulfur hexafluoride	SF_6	23,900	3,200

[(1)] The warming effects over a 100-year time frame relative to other GHG.
Source: USEPA 2011

California Health and Safety Code Section 38505(g) defines GHGs to include the following compounds: carbon dioxide, methane, nitrous oxide, chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride ($SF_{6)}$. Descriptions of these compounds and their sources are provided below.

Carbon Dioxide

Carbon dioxide (CO_2) enters the atmosphere through the burning of fossil fuels, solid waste, trees and wood products, and as a result of other chemical reactions such as through the manufacturing of cement. Globally, the largest source of CO_2 emissions is the combustion of fossil fuels in power plants, automobiles, industrial facilities, and other similar sources. A number of specialized industrial production processes and product uses such as mineral production, metal production, and petroleum-based products uses also produce CO_2 emissions. CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. As part of the carbon cycle billions of tons of atmospheric CO_2 are removed from the atmosphere by oceans and growing plants, also known as 'sinks', and are emitted back into the atmosphere annually through respiration, decay, and combustion, also known as 'sources'. When in balance, the total CO_2 emissions and removals from the entire carbon cycle are roughly equal. Since the Industrial Revolution in the 1700s, human activities, such as the burning of oil, coal and gas or deforestation, have increased CO_2 concentrations in the atmosphere. In 2005, global atmospheric concentrations of CO_2 were 35 percent higher than they were before the Industrial Revolution (EPA 2010).

Methane

Methane (CH_4) is emitted from a variety of both human-related and natural sources. Human-related activities include fossil fuel production, animal husbandry, rice cultivation, biomass burning, and waste management. CH_4 is emitted during the production and transport of fossil fuels. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal

solid waste landfills. It is estimated that 60 percent of global CH_4 emissions are related to human activities. Natural sources of CH_4 include wetlands, gas hydrates, permafrost, termites, oceans, freshwater bodies, non-wetland soils, and wildfires. CH_4 emission levels from a source can vary significantly from one country or region to another, depending on many factors such as climate, industrial and agricultural production characteristics, energy types and usage, and waste management practices. For example, temperature and moisture have a significant effect on the anaerobic digestion process, which is one of the key biological processes that cause CH_4 emissions in both human-related and natural sources. Also, the implementation of technologies to capture and utilize CH_4 from sources such as landfills, coal mines, and manure management systems affects the emission levels from these sources (EPA 2010).

Nitrous Oxide

Nitrous Oxide (N_2O) is produced by both natural and human-related sources. N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Primary human-related sources of N_2O are agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic (fatty) acid production, and nitric acid production. N_2O is also produced naturally from a wide variety of biological sources in soil and water, particularly microbial action in wet tropical forests. N_2O emission levels from a source can vary significantly from one country or region to another, depending on many factors such as industrial and agricultural production characteristics, combustion technologies, waste management practices, and climate. For example, heavy utilization of synthetic nitrogen fertilizers in crop production typically results in significantly more N_2O emissions from agricultural soils than that occurring from less intensive, low-tillage techniques. Also, the presence or absence of control devices on combustion sources, such as catalytic converters on automobiles, can have a significant effect on the level of N_2O emissions from these types of sources (EPA 2010).

Fluorinated Gases

CFCs, HFCs, and SF_6 are synthetic, powerful GHGs that are emitted from a variety of industrial processes, including aluminum production, semiconductor manufacturing, electric power transmission, magnesium production and processing, and the production of Chlorodifluoromethane (HCFC-22), commonly used in air conditioning applications. These gases are typically emitted in smaller quantities, but have higher GWP than other GHGs (EPA 2011).

4.7.1.3 Global, National, Statewide, and Countywide GHG Inventories

In an effort to evaluate and reduce the potential adverse impact of global climate change, international, state and local organizations have conducted GHG inventories to estimate their levels of GHG emissions and removals. The following summarizes the results of these global, national, state, countywide, and local GHG inventories.

Global

Worldwide anthropogenic GHG emissions in 2006 were approximately 49,000 million metric tons (MMT) CO_2e, including ongoing emissions from industrial and agricultural sources and emissions from land use changes (i.e., deforestation, biomass decay) (IPCC 2007). CO_2 emissions from fossil fuel use accounts for 56.6 percent of the total emissions of 49,000 MMT CO_2e (includes land use changes) and all CO_2

emissions are 76.7 percent of the total. CH_4 emissions account for 14.3 percent and N_2O emissions for 7.9 percent of GHG (IPCC 2007).

United States

The EPA publication, *Draft Inventory of U.S. GHG Emissions and Sinks: 1990-2009,* provides a comprehensive emissions inventory of the nation's primary anthropogenic sources and sinks of GHGs. Overall, total U.S. emissions had risen by 13 percent from 1990 to 2008, while the U.S. gross domestic product (GDP) had increased by 65 percent over the same period. Emissions decreased from 2008 to 2009, decreasing by six percent to 6,640 MMT CO_2e. GDP also decreased by three percent from 2008 to 2009. The publication indicated that the following factors were primary contributors to this decrease: 1) a decrease in economic output resulting in a decrease in energy consumption across all sectors, and 2) a decrease in the carbon intensity of fuels used to generate electricity due to fuel switching as the price of coal increased, and the price of natural gas decreased significantly (EPA 2011).

California

California is a substantial contributor of GHG as it is the second largest contributor in the U.S. and the 16th largest in the world. According to the CARB, California generated 478 MMT CO_2e in 2008. According to the CARB, GHG emissions in California are mainly associated with fossil fuel consumption in the transportation sector (37 percent). Electricity production is the second-largest source of GHG emissions (24 percent). Recycling and waste handling and industrial, agriculture, forestry, commercial, and residential activities comprise the balance of California's GHG emissions. Emissions of GHG were offset slightly in 2008 by the sequestration (intake) of carbon within forests, reducing the overall emissions by 4.0 MMT CO_2e, resulting in net emissions of about 474 MMT CO_2e.

San Diego County

In addition to the California GHG Inventory, a more specific county-wide GHG inventory was prepared by the University of San Diego School of Law Energy Policy Initiative Center (EPIC) in 2008. This San Diego County GHG Inventory (SDCGHGI) is a detailed inventory that considers the unique characteristics of the region in calculating emissions. In 2006, a total of 34.4 MMT CO_2e was generated by both the incorporated and unincorporated areas of the county. The largest contributor of GHG was from the on-road transportation category, which comprised 46 percent (16 MMT CO_2e) of the total amount. The second highest contributor was the electricity category, which contributed 9 MMT CO_2e, or 25 percent of the total. Together the on-road transportation and electricity category comprised 71 percent of the total GHG emissions for the San Diego region. The remaining amount was contributed by natural gas consumption, civil aviation, industrial processes, off-road transportation, waste, agriculture, rail, water-borne navigation, and other fuels.

City and Carlsbad Municipal Water District Facilities

Sources of GHGs from existing City and CMWD facilities include indirect emissions from the consumption of electricity (pump and lift station operation, security lighting), direct emissions produced on property from stationary combustion sources (diesel-powered equipment), and mobile sources (City or CMWD-owned vehicles). Sewer, water, and recycled water facilities also include the City and CMWD offices, which generate GHG emissions from electricity and natural gas use, and vehicle trips to and from the office.

4.7.1.4 Regional Adverse Effects of Climate Change

The San Diego Foundation's Regional Focus 2050 Working Paper and Technical Assessment explored what the San Diego region would be like in 2050 if current climate change trends continue. The paper projected potential adverse effects on the San Diego region related to climate, energy needs, public health, wildfires, water supply, sea level, and ecosystems. The climate model simulations exhibited warming across San Diego County, ranging from about 1.5 °F to 4.5 °F, particularly in inland areas. Temperature changes for areas along the coast would be moderated by the influence of the Pacific Ocean. The increase in peak demand for electricity for cooling could result in blackouts and power outages without adequate planning. With an aging population, extreme-heat conditions in the San Diego region are also a public health concern. Other health concerns include increased ozone air pollution levels due to an increase in sunny days, which can exacerbate asthma and other respiratory and cardiovascular diseases; increased fire-related injuries and death as intense wildfires occur more frequently; and coastal algal blooms, which can harbor toxic bacteria and other diseases. Drought years might occur as much as 50 percent more often and be considerably drier. Even with plans in place to conserve, recycle, and augment our available water, it is estimated San Diego County could face an 18 percent shortfall in water supply by 2050. Rising sea levels will have a major impact on the San Diego region's environment and economy, particularly in coastal areas. High tide flooding will threaten low-lying coastal communities and impact military, port and airport operations. High surf events and rising sea levels will cause even greater coastal erosion. Climate change will also add to the pressures on the variety of habitats and species in the county. The locations where environmental conditions are suitable for a particular species will shift with climate change. To survive, some animals and plants will have to relocate to find new habitat or potentially face extinction.

4.7.2 Regulatory Framework

4.7.2.1 Federal

Federal Clean Air Act

The Federal CAA, as amended, establishes air quality standards for several pollutants. These standards are divided into primary standards and secondary standards. Primary standards are designed to protect public health, and secondary standards are intended to protect public welfare from effects such as visibility reduction, soiling, nuisance, and other forms of damage. In 2006, twelve U.S. states and cities, in conjunction with several environmental organizations, sued to require the EPA to regulate GHGs as a pollutant pursuant to the CAA. The Supreme Court ruled that GHGs fit within the CAA's definition of a pollutant. The court held that the EPA must determine whether or not GHG emissions have the potential to endanger public health or welfare, consistent with the language in the CAA. On April 2, 2007, the EPA declared that GHGs, including CO_2, are air pollutants covered by the CAA. This public review for this proposal terminated on June 23, 2009. Despite the Supreme Court ruling and the EPA proposal, there are no promulgated federal regulations to date limiting GHG emissions that are applicable to the project (ICF Jones & Stokes 2009).

Final Mandatory Reporting of GHG Rule

The EPA is the federal agency responsible for setting and enforcing the federal ambient air quality standards for atmospheric pollutants. The EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The EPA also has

jurisdiction over emission sources outside state waters (outer continental shelf), and establishes various emissions standards for vehicles sold in states other than California. In September 2009, the EPA issued the Final Mandatory Reporting of GHG Rule. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S., and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons (MT) or more per year of GHG emissions are required to submit annual reports to EPA. The EPA estimates that the rule covers about 10,000 facilities nationwide, accounting for about 85 percent of GHG emissions in the U.S.

4.7.2.2 State

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, the California State Legislature adopted AB 32, the California Global Warming Solutions Act of 2006. AB 32 focuses on reducing GHG in California. GHGs as defined under AB 32 include CO_2, CH_4, N_2O, HFCs, CFCs, and SF_6. Under AB 32, CARB has the primary responsibility for reducing GHG emissions and continues the CCAT to coordinate statewide efforts and promote strategies that can be undertaken by many other California agencies. AB 32 requires the CARB to adopt rules and regulations that would achieve GHG emissions equivalent to state-wide levels in 1990 by 2020. In general, AB 32 directs the CARB to adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources that CARB finds necessary to achieve the statewide GHG emissions limit. CARB is also directed to monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

CARB has made available a list of discrete early action GHG emission reduction measures. CARB has also published a staff report titled *California 1990 GHG Emissions Level and 2020 Emissions Limit* that determined the statewide levels of GHG emissions in 1990 (CARB 2007). CARB identified 427 MMT CO_2e as the total statewide aggregated GHG 1990 emissions level and 2020 emissions limit. Additionally in December 2008, the CARB adopted the Climate Change Scoping Plan, which outlines the state's strategy to achieve the 2020 GHG limit. This scoping plan proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs, and enhance public health. The plan emphasizes a cap-and-trade program, but also includes the discrete early actions.

Regional Targets Advisory Committee Reduction Targets

The CARB, a part of the California EPA is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, CARB conducts research, sets state ambient air quality standards, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products (such as hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

The CARB Regional Targets Advisory Committee (RTAC), which was appointed in January 2009 to help address the requirements of SB 375, was tasked with recommending a method by which each major

region of the state could reduce GHG emissions through more sustainable land use and transportation planning. After numerous public meetings in Sacramento, the RTAC, in its September 29, 2009 report, recommended that regional targets be expressed as a percent per-capita GHG emission reduction from a 2005 base year. This differs from the 1990 base year established in Assembly Bill (AB) 32, described below, due to a lack of reliable regional transportation and land use data from 1990 (according to the RTAC). The RTAC also recommended CARB use an interactive process with the regional Metropolitan Planning Organizations, such as SANDAG, to set a single statewide uniform target that could be adjusted up or down to respond to regional differences. SANDAG proposed a target of reducing per-capita GHG emissions to seven percent below 2005 emissions by 2020, and 13 percent below 2005 emissions by 2035. The CARB adopted the regional targets, including SANDAG's proposed targets, on September 23, 2010.

California Code of Regulations Title 24, Part 6

Although it was not originally intended to reduce GHG emissions, CCR Title 24 Part 6: *California's Energy Efficiency Standards for Residential and Nonresidential Buildings* were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Energy efficient buildings require less electricity. Electricity production by fossil fuels results in GHG emissions. Therefore, increased energy efficiency results in decreased GHG emissions.

Executive Order S-3-05

California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following GHG emission reduction targets: by 2010 reduce GHG emissions to 2000 levels; by 2020 reduce GHG emissions to 1990 levels; by 2050 reduce GHG emissions to 80 percent below 1990 levels. The first CCAT Report to the Governor in 2006 contained recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met. The latest CCAT Biennial Report was released in April 2010. It expands on the policy oriented 2006 assessment. This report provides new information and scientific findings. The new information and details in the CCAT Assessment Report include development of new climate and sea-level projections using new information and tools that have become available in the last two years, and evaluation of climate change within the context of broader social changes such as land-use changes and demographic shifts (CCAT 2010). The action items in the draft report focus on the preparation of the Climate Change Adaptation Strategy required by Executive Order S-13-08 and described below.

Senate Bill 97

SB 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. It directed the California Office of Planning and Research (OPR) to develop draft CEQA Guidelines "for the mitigation of GHG emissions or the effects of GHG emissions." The guideline amendments have been adopted and became effective March 18, 2010. The amendments provide regulatory guidance with respect to the analysis and mitigation of the potential effects of GHG emissions.

Senate Bill 375

SB 375 provides a land use and transportation policy to meet the goals of AB 32. SB 375 builds on the existing regional transportation planning process (which is overseen by local elected officials with land

use responsibilities) to connect the reduction of GHG emissions from cars and light trucks to land use and transportation policy. SB 375 requires the CARB to establish the GHG emission reduction targets for each region (as opposed to individual cities or households) and to review the region's determination that its plan achieves those targets. SB 375 has three goals to: 1) use the regional transportation planning process to help achieve AB 32 goals, 2) use CEQA streamlining as an incentive to encourage residential projects which help achieve AB 32 goals to reduce GHG emissions, and 3) coordinate the regional housing needs allocation process with the regional transportation planning process.

4.7.2.3 Regional

Regional Transportation Plan and Sustainable Communities Strategy

The 2050 Regional Transportation Plan and Sustainable Communities Strategy were adopted by SANDAG on October 28, 2011. The EIR prepared for the plan was also certified on this date. As of early 2012, the adequacy of the 2050 Regional Transportation Plan EIR is being litigated. The 2050 Plan maps out a system designed to maximize transit enhancements, integrate biking and walking elements, and promote programs to reduce demand and increase efficiency. The Transportation Plan also identifies the plan for investing in local, state and federal transportation facilities in the region over the next 40 years. The Sustainable Communities Strategy integrates land use and housing planning within the transportation plan, and also addresses how the transportation system will be developed in such a way that the region is able to reduce per-capita GHG emissions to state-mandated levels.

County of San Diego Guidelines for Determining Significance – Climate Change

The County of San Diego published its Guidelines for Determining Significance for Climate Change on February 17, 2012. The purpose of the guideline document is to ensure that new development achieves its fair share of emissions reductions needed to meet the statewide AB 32 mandate. The County's guidelines establish a screening level threshold of 2,500 MT of CO_2e emitted annually. Projects that would emit more than 2,500 MT CO2e annually would result in a potentially significant cumulatively considerable impact and would be required to incorporate measures from the County's Climate Action Plan (CAP) and prepare a technical analysis to demonstrate that the project's design features, along with CAP measures and, if necessary, additional mitigation measures, are incorporated that would allow the project to be below the applicable County significance threshold. There are four possible thresholds: one based on GHG emissions per service population, a maximum for annual GHG emissions from development projects, a GHG limit for stationary emissions sources, and a required percent reduction compared to business as usual emissions.

4.7.3 Project Impacts and Mitigation

The following section addresses potential impacts relating to GHG emissions that could result from implementation of the proposed Master Plans. Due to the nature of assessment of GHG emissions and the effects of climate change, impacts can currently only be analyzed from a cumulative context. Individual projects are generally of insufficient magnitude by themselves to influence climate change or result in a substantial contribution to the global GHG inventory. Thus GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emissions impacts from a climate change perspective (CAPCOA 2008). Accordingly, discussion of the proposed Master Plans' GHG emissions and impact on global climate are addressed in terms of the proposed Master Plans' contributions to a cumulative impact on the global climate.

4.7.3.1 Direct and Indirect Generation of GHG and Consistency with Applicable Plans Adopted for Reducing GHG

Greenhouse Gas Emissions Cumulative Summary

Would implementation of the Sewer, Water, and Recycled Water Master Plans generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or that would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG?

Cumulative Impact	Significant?	Project Contribution
Generation of GHG emissions that would conflict with an applicable plan intended to reduce the emissions of GHG.	Yes	Not cumulatively considerable.

Standards of Significance

Based on Appendix G of the CEQA Guidelines and guidelines for determining GHG significance in the County of San Diego, the Master Plans would result in a significant greenhouse gas emission impact if the CIP projects would result in a net increase of more than 2,500 metric tons (MT) CO_2e emissions annually over baseline conditions.

The County of San Diego published its Guidelines for Determining Significance for Climate Change on February 17, 2012. As stated in this document, the guidelines are based on regional data, including the incorporated cities and may be used by lead agencies in the region other than the County of San Diego. The purpose of the guideline document is to ensure that new development achieves its fair share of emissions reductions needed to meet the statewide AB 32 mandate. The County's guidelines establish a screening level threshold of 2,500 MT of CO_2e emitted annually during either construction or operation. Projects that would emit more than 2,500 MT CO_2e annually during either construction or operation would result in a potentially significant cumulatively considerable impact. The guidelines include screening criteria specific to construction to determine whether a construction project would potentially result in annual emissions of greater than 2,500 MT CO_2e:

- Grading and clearing of more than 1,285 acres of land.
- Grading and clearing of more than 100 acres of land requiring more than 3,100 cubic yards per day of soil hauling.
- A project that would haul more 3,300 cubic yards per day.
- New roadway, trail, or pathway construction of more than 3 miles that would disturb more than 80 acres of land area and would involve more than 3,100 cubic yards per day of soil hauling.
- Repaving of an existing roadway, trail, or pathway of more than 6 miles that would disturb more than 241 acres of land area per year.
- New pipeline of more than 11 miles that would disturb more than 81 acres of land and result in more than 3,100 cubic yards per day of soil hauling.

The above threshold was determined to be applicable by the City of Carlsbad, based on its independent review and consideration of the County's guidelines. Section 15064.4 (b) of the CEQA Guidelines states

that a lead agency should consider the following factors when assessing the significance of impacts from GHG emissions on the environment:

1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Additionally, Section 15064.4(a) of the CEQA Guidelines states that the determination of the significance of GHG emissions should rely on a qualitative analysis or performance based standards.

The significance threshold is consistent with the first and third considerations because the County determined a significance threshold of 2,500 MT CO_2e based on the existing regional environmental setting and future compliance with regulations pertaining to GHG emissions, such as AB 32. The threshold is consistent with the second consideration because it establishes a numeric threshold for comparison to the project's GHG emissions. The City of Carlsbad has analyzed and independently reviewed this information and has determined that the thresholds of significance comply with Section 15064.4(a) of the CEQA Guidelines because the thresholds require a qualitative analysis and establish performance based standards.

Impact Analysis

An inventory of the three most common GHGs (CO_2, CH_4, and N_2O) likely to be emitted by the CIP projects is presented below.

Construction Emissions

Construction of CIP projects proposed under the Master Plans would result in temporary emissions of GHG from the operation of construction equipment and from worker and building supply vendor vehicles. Equipment that would be associated with construction of the CIP projects includes dozers, rollers, dewatering pumps, backhoes, loaders, delivery, and haul trucks. GHG emissions for construction were based on the assumptions listed for the worst-case daily construction scenario described in Section 4.2 (Air Quality) of this EIR. As discussed in Section 4.2.3.2 (Issue 2), the CIP projects proposed within the Master Plans would be constructed over a 23 year period between 2012 and 2035. The worst-case daily construction scenario assumes the highest intensity of projects that would occur in one year (year 2014), including all projects projected to begin in 2014, all annual programs, and a portion of projects with no projected start date. The actual amount of development that would occur would likely be less than projected in 2014, and would be much lower in other development years. There are currently some years that do not have any projects scheduled for construction. The actual start dates of construction would be dependent on several factors, including rate of development or funding. Therefore, development would be expected to be more evenly spread out between development years, and the worst-case scenario represents a conservative estimate of the maximum annual emissions that would result from CIP construction. As discussed in Section 4.2.3.2 (Issue 2), the worst-case simultaneous daily construction scenario includes the following projects:

- Pump replacement at one location (Sewer CIP Project SR-2)
- Removal of one lift station (Sewer CIP Project SR-6)
- 16,374 feet of sewer pipeline installation (Sewer CIP Projects SR-9, SR-11, SR-16, I-2, I-3, I-4, I-5, and annual contribution of unknown start date projects)
- One wetwell and pump replacement (Sewer CIP Project SR-15)
- 1.5 acres of new sewer access roads (Sewer CIP Project SR-22)
- Installation of a new pump (Sewer CIP Project I-2)
- 0.3 acre of water access roads improvements (Water CIP Project R4)
- 33,289 feet of water pipeline installation (Water CIP Projects F1, F2, F3, F5, F6, 10, 21, 48, 54, 56, 45, and annual contribution of unknown start date projects)
- Installation of a new pressure regulating station (Water CIP Project 21)
- Removal and relocation of an existing "E" tank (Water CIP Project R5 and Recycled Water CIP P77)
- Removal of Ellery pump station and replacement with portable pump (Water CIP Project PS2)
- 70,850 feet of recycled water pipeline installation (Recycled Water CIP Projects ES5A, ES7, ES8, ES9, the P71 segment of ES18, and P74)
- Increase the capacity of the Carlsbad Water Recycling Facility (Recycled Water CIP Project P80)

The worst-case construction scenario would result in a total land disturbance of approximately 12 acres. The worst-case scenario would require a maximum of approximately 215 cubic yards of hauling per day for import and export of soil and hauling of demolished material. The worst-case scenario would result in a total paving area of approximately 12 acres, including repaving trenching areas. Therefore, the Master Plans would not grade or clear more than 100 acres of land per year, require more than 3,100 cubic yards per day of soil hauling, or disturb more than 80 acres of land area for roadway or trail construction or repaving. Implementation of the Master Plans would not exceed the screening criteria for construction activities. Additionally, the total GHG emissions that would result from construction of the CIP projects during the worst-case annual construction scenario are provided in Table 4.7-2. GHG emissions associated with construction of the CIP projects would contribute a maximum of approximately 959 MT CO_2e annually to the regional GHG inventory. Annual emissions would be lower during implementation years that include a less intense development schedule. Therefore, construction of the CIP projects proposed in the Master Plans would not exceed the 2,500 MT CO_2e significance threshold and would result in a less than significant contribution to cumulative GHG emissions.

Table 4.7-2 Estimated Worst-Case Annual GHG Emissions for CIP Project Construction

Emission Source	GHG Emissions (Metric Tons CO_2e)
Demolition of Existing Structures	64
Grading[(1)]	281
Trenching	137
Paving	113
Building Construction and Equipment Removal or Installation	360
Coating	4
Total	**959**
Significance Threshold	**2,500**
Significant Impact?	No

(1) Includes hauling of imported and exported trench material

Source: URBEMIS 2007. See Appendix E.

Operational Emissions

Operational GHG emissions from the CIP projects would include indirect emissions from electricity usage and direct emissions from mobile sources. Potential GHG emissions from these sources are discussed below. The proposed CIP projects would not result in an increase in demand for natural gas, water, or solid waste disposal services; therefore, no increase in GHG emissions would occur from these sources.

Electricity Usage

Pipeline projects, once constructed, would not require the use of electricity, emergency generators, or any other type of fuel-consuming operating equipment. Additionally, the proposed repairs and improvements to existing facilities would not result in an increase in energy demand at these facilities. Some CIP projects would reduce the number and capacity of lift station pumps (Sewer CIP Projects SR-6, SR-10, and SR-11, and Water CIP Project PS2), which would result in a reduction in energy use compared to existing conditions. However, the proposed Master Plans would upgrade the capacity of several pump stations (Sewer CIP Projects I-4, SR-2, and SR-25; and Water CIP Projects PS1, PS3, and PS4), install new emergency generators (Water CIP Projects PS1 and F14), construct new pump and lift stations (Sewer CIP Project I-1 and Water CIP Projects F14 and 51), construct a groundwater treatment plant (Water CIP 52), install new lights at Maerkle Reservoir (R7), and increase the capacity of the CWRF (Sewer CIP projects 81 and 82) that would result in an increase in electricity demand. The existing energy demand at similar facilities was used to estimate the net increase in electricity demand that would occur with implementation of the CIP projects. The new electric emergency generators are assumed to be tested monthly for 30 minutes. The upgraded sewer pump stations and new Buena Vista lift station would result in an annual increase in demand of approximately 390,000 kilowatt per hour (kWh). The new water pump stations, upgraded pump station capacities, and the new groundwater facilities would result in an annual increase in demand of approximately 1.46 million kWh. The increase in capacity at the CWRF would result in a net increase in demand of 2.11 million kWh. The total net increase in electricity demand would be approximately 3.96 million kWh at buildout of the sewer, water, and recycled water systems, which is approximately double existing electricity demand, as discussed in Section 4.5 (Energy) of this EIR.

The information in Table 4.7-3 serves as a guide for the likely net increase in annual GHG emissions of the Master Plans from electricity usage. However, it is possible that actual annual GHG emissions of each proposed pump or lift station may vary from this estimate once in operation. Proposed pump and lift stations vary both in size (firm capacity) and in frequency of use. Some pump and lift stations would be in operation more than others, due to the location and the overall demand of the local customer base, which would influence the monthly electricity consumption and GHG emissions of each station. Using these assumptions, the estimated GHG emissions for the Master Plans from the net increase in electricity use is 1,306 MT CO_2e.

Table 4.7-3 Estimated Annual Net Increase in City and CMWD Operational GHG Emissions

Source	Annual Emissions (metric tons) (CO_2e)
Electricity Usage	1,306
Mobile (Vehicular Use)	1
Total	**1,307**
Significance Threshold	**2,500**
Significant Impact?	No

Source: Atkins 2012. See Appendix E.

Mobile Sources

The majority of the proposed CIP projects are underground pipelines, improvements to existing facilities, or the construction of new facilities on existing City and CMWD property in Carlsbad, Oceanside, San Marcos, and Vista. Following construction, the underground pipelines would be passive and would not require regular maintenance. Occasional vehicle trips may be required for repair or inspection, similar to existing pipelines. Existing City and CMWD facilities require vehicle trips for maintenance. New facilities or improvements at these locations would not result in new maintenance vehicle trips. The proposed groundwater pump (Water CIP Project 51) and treatment facility (Water CIP Project 52) would require regular maintenance trips; however, the Gateshead lift station, Simsbury lift station, and Vancouver lift station (Sewer CIP Projects SR-6 and SR-11) would be removed and would no longer require maintenance trips. Therefore, the Master Plans would not generate a substantial net increase in vehicle trips. For the purposes of this analysis, it was conservatively assumed that a net increase of one maintenance trip per day would be required from the City of Carlsbad building on Faraday Avenue to the farthest CIP project (Recycled Water CIP Project ES4C). Using these assumptions, it is estimated that the proposed CIP projects would result in annual GHG emissions of 1 MT CO_2e.

As shown in Table 4.7-3, the total net increase in annual direct and indirect GHG emissions from construction and operation of the CIP projects in the proposed Master Plans is estimated to be 1,307 MT CO_2e per year. Therefore, the operational GHG emissions associated with the proposed Master Plans would not exceed the significance threshold of 2,500 MT CO_2e and this impact would be less than significant. Some overlap of construction and operation would occur until buildout of the CIP projects is complete. The maximum construction emissions shown in Table 4.7-2 would not be expected to occur each year, and the operational buildout emissions would not occur until construction is complete. However, even if maximum construction and operational emissions would occur simultaneously, annual GHG emission associated with the Master Plans would be approximately 2,271 MT CO_2e and would not exceed the 2,500 MT CO_2e threshold. Therefore, the proposed Master Plans would not exceed the significance threshold of 2,500 MT CO_2e during simultaneous construction and operations and this impact would be less than significant.

Hazards Related to Climate Change

The San Diego Foundation's Regional Focus 2050 Working Paper and Technical Assessment projected potential adverse effects on the San Diego region related to climate, energy need, public health, wildfires, water supply, sea level, and ecosystems. The following analysis discusses potential hazards related to climate change that the sewer, water, and recycled water service areas may be subject to in the future.

Warming across San Diego County is projected to increase 1.5 °F to 4.5 °F between the years 2000 and 2050. Warmer temperatures would increase the peak demand for electricity and could result in blackouts and power outages. The Master Plans do not include any structures that would be used for human occupation. Water use rises with temperature and may require an above average amount of pumping operations; however, pumping operations would not be able to exceed the maximum capacities proposed in the Master Plans. The Master Plans proposed the pumping and pipeline facilities necessary to serve projected future development; no unplanned growth would be served by the proposed facilities. Therefore, increased peak energy demand would potentially occur at the CIP projects; the increase demand would be the result of projected growth. No unplanned growth would occur as a result of the CIP projects that would result in additional peak energy demand. Therefore, the

proposed project would not result in an increased number of blackouts as result of increased peak energy demand.

Regarding public health, increases in ozone air pollution levels as a result of climate change could exacerbate asthma and other respiratory and cardiovascular diseases. Fire-related injuries and death are likely to increase as intense wildfires occur more frequently. Additionally, cases of mosquito-related diseases could increase, and algal blooms with toxic bacteria could occur more frequently along the coast. As discussed in Section 4.2 (Air Quality), the proposed Master Plans would not exceed the screening-level criteria threshold for ozone precursors (NO_x and VOCs) during construction or operation. Therefore, the Master Plans would not significantly increase exposure to health risks from ozone. Exposure to fire risk would not increase because the Master Plans do not propose any structures for occupancy and would make water sources more reliable for fire fighting. The CIP projects would not result in unplanned growth that would result in additional residents with the potential to be exposed to algal blooms along the coast. The proposed Master Plans would not result in an increased exposure to public health concerns.

It is estimated that San Diego County could face an 18 percent shortfall in water supply by 2050. However as discussed in Chapter 5.1 (Utilities and Service Systems), the proposed Master Plans would be responding to projected growth in the region. It would not result in the need for new or expanded water and sewer supplies.

Rising sea levels have the potential to result in high tide flooding, cause even greater coastal erosion and scouring, and put pipelines at risk for saltwater intrusion. The western area of the sewer, water, and recycled water service areas is located along the coast. However, the CIP projects do not propose any new facilities along the coastline or surrounding the lagoons, or any outfalls along the coast that would be subject to saltwater intrusion. Sewer CIP Project I-2 would increase the capacity of the Buena Vista lift station and Sewer CIP Project SR-25 would make improvements to the Home Plan Sewer lift station, both near Buena Vista Lagoon. Sewer CIP Project SR-15 and Sewer CIP Project I-4 would replace the existing pumps at the Foxes Landing lift station and Agua Hedionda lift Station, both near Agua Hedionda Lagoon. Recycled Water CIP Projects P80 and P81 would increase the capacity of the CWRF within 0.5 mile of the coast. However, these projects make improvements to existing facilities and would not result in additional facilities at risk for sea level rise or coastal erosion. Therefore, the CIP projects would not result in increased exposure to high tide flooding, coastal erosion, and saltwater intrusion. As discussed in Section 4.9 (Hydrology and Water Quality), the proposed CIP projects would not result in a significant increase in erosion during construction or operation; it would not exacerbate coastal erosion.

Climate change will also add to the pressures on the variety of habitats and species in the county. As discussed in Section 4.3 (Biological Resources), the proposed Master Plans would mitigate all of the potentially significant impacts to biological resources to a less than significant level. Therefore, the proposed Master Plans would not result in the increased exposure of biological resources to risks from climate change.

Mitigation Measures

Impacts related to GHG emissions would be less than significant. No mitigation is required.

Significance After Mitigation

Impacts related to GHG emissions would be less than significant without mitigation.

4.7.4 Cumulative Impacts

Due to the nature of assessment of GHG emissions and the effects of climate change, impacts can currently only be analyzed from a cumulative context. Therefore, the analysis provided above includes the analysis of cumulative impacts.

4.7.5 References

California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA and Climate Change: Evaluating and Addressing GHG Emissions from Projects Subject to the California Environmental Quality Act. January.

California Air Resources Board (CARB). 2007a. California 1990 GHG Emissions Level and 2020 Emissions Limit. November.

California Air Resources Board (CARB). 2007b. Proposed Early Actions to Mitigate Climate Change in California. April 20.

California Air Resources Board (CARB). 2008. Climate Change Scoping Plan – A Framework For Change. December.

California Air Resources Board (CARB). 2010. California Greenhouse Gas Inventory for 2000-2008 – by Category as Defined in the Scoping Plan. May 12. Accessed March 27, 2012, available at http://www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-08_2010-05-12.pdf

California Climate Action Team (CCAT). 2007. Climate Action Team Proposed Early Actions to Mitigate Climate Change in California. Accessed December 10, 2007, available at http://www.climatechange.ca.gov/climate_action_team/reports/index.html

California Climate Action Team (CCAT). 2010. California Action Team Biennial Report. April.

California Climate Change Center. 2006. Climate Scenarios for California. March.

California Climate Change Portal. 2009. California Climate Adaptation Strategy overview. Accessed July 2, 2009, available at http://www.climatechange.ca.gov/adaptation/index.html

California Governor's Office of Planning and Research. 2009. CEQA Guideline – Sections to be Added or Amended. April 13.

County of San Diego, Department of Planning and Land Use (DPLU). 2012. Draft County of San Diego Guidelines for Determining Significance. February 17.

Energy Policy Initiatives Center, University of San Diego School of Law. 2008. San Diego County GHG Inventory. September 2008. Accessed July 2, 2009, available at http://www.sandiego.edu/epic/ghginventory

Global Carbon Project. 2011. Carbon Budget 2010 - Highlights. December 5. Accessed March 27, 2011, available at http://www.globalcarbonproject.org/carbonbudget/

ICF Jones & Stokes. 2009. Sunroad Harbor Island Hotel Project and East Harbor Island Subarea Port Master Plan Amendment Draft Environmental Impact Report. December 2009.

Intergovernmental Panel on Climate Change (IPCC). 2007. R.B. Alley et al. Climate Change 2007: The Physical Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.

Atkins 2012. Greenhouse Gas Emission Calculations for Proposed City and CMWD facilities.

The San Diego Foundation. 2008. San Diego Foundation Regional Focus 2050 Study.

U.S. Environmental Protection Agency (EPA). 2011. Draft Inventory of U.S. GHG Emissions and Sinks: 1990-2009. February 15.

U.S. Environmental Protection Agency (EPA). 1998. State Workbook: Methodologies For Estimating Greenhouse Gas Emissions, Third Edition. May.

U.S. Environmental Protection Agency (EPA). 2010. Greenhouse Gas Emissions website. Updated on April 30. Accessed in May 2010, available at http://epa.gov/climatechange/emissions/index.html#ggo